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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,413

06/20/2006

Naohiro Yoshida

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OLIFF & BERRIDGE, PLC  
P.O. BOX 320850  
ALEXANDRIA, VA 22320-4850

EXAMINER

CHUO, TONY SHENG HSIANG

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

03/01/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com  
jarmstrong@oliff.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,413	<b>Applicant(s)</b> YOSHIDA, NAOHIRO	
	<b>Examiner</b> Tony Chuo	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 20,22,23,25-27 and 32-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20,22,23,25-27 and 32-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Claims 20, 22, 23, 25-27, and 32-36 are currently pending. Claims 1-19, 21, 24, 28-31 are cancelled. New claims 33-36 have been added. The previous objection to the specification is withdrawn. The previous objection to claim 22 is withdrawn. The previous 112, 2<sup>nd</sup> paragraph rejection of claims 17, 20-29, and 32 is withdrawn. The amended claims do overcome the previously stated 102 rejections. However, upon further consideration, claims 20, 22, 23, 25-27, and 32-36 are rejected under the following new 112, 102, and 103 rejections. This action is made FINAL as necessitated by the amendment.

### ***Claim Objections***

2. Claims 35 and 36 are objected to because of the following informalities: Claims 35 and 36 appear to recite the same subject matter as claims 26 and 27, respectively. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claims 20, 22, 23, 25-27, 35, and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 20 recites the limitation "the estimating means" in line 11. There is insufficient antecedent basis for this limitation in the claim.

6. Claims 35 and 36 are indefinite because these claims depend on cancelled claim 1. For purpose of compact prosecution, claims 35 and 36 are construed as being dependent on claim 20.

***Claim Rejections - 35 USC § 102/103***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. Claims 20, 22, 25-27, and 32-36 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoshida et al (WO 2004/049488).

Regarding claims 20, 26, 32, 35, and 36, the Yoshida reference discloses a fuel cell system comprising a fuel cell stack "10" which generates electricity by a chemical reaction between hydrogen (fuel gas) supplied to an anode side of the fuel cell stack and air (oxidization gas) supplied to a cathode side of the fuel cell stack; a control unit "100" that determines whether hydrogen migration through the electrolyte membrane (chemical short) is occurring in the fuel cell during the intermittent operation mode when the supply of fuel gas and oxidization gas to the fuel cell is stopped; a compressor "41" for supplying a small amount of air (scavenging gas) to the cathode side that is less than the amount of air supplied to the cathode side when the fuel cell is idling when it has been determined that there is hydrogen migration through the electrolyte membrane; a pressure sensor "51" for detecting a gas pressure of the hydrogen on the anode side of the fuel cell stack; valves "24" & "25" for closing off the anode side of the fuel cell stack when the supply of hydrogen and air to the fuel cell stack is stopped, wherein the control unit "100" also obtains a gas pressure decrease amount of the hydrogen sealed on the anode side by the anode side being closed off by the valves "24" & "25" (See pages 7, 8, 11, 14 and Figures 1 and 7). It also discloses that migration of a portion of hydrogen through an electrolyte membrane from the anode side to the cathode side results in a chemical reaction (chemical short) on the cathode side so that oxygen present in the piping 35 is consumed and also the reduction in the

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amount of oxygen is offset by a supply of oxygen provided by appropriately operating the compressor “41”, which is normally stopped during the intermittent operation mode (See page 11). Since the control unit determines the gas pressure decrease amount of the hydrogen sealed on the anode side, it is also capable of determining the amount of oxygen consumed on the cathode due to the hydrogen migration through the electrolyte membrane. The chemical reaction on the cathode side consumes oxygen based on the amount of hydrogen that migrates through the electrolyte membrane. The teaching of a known amount of the hydrogen that migrates through an electrolyte membrane from the anode side to the cathode side that results in a chemical reaction (chemical short) on the cathode side that consumes oxygen provides support for the control unit inherently determining a consumption amount of oxygen on the cathode side based on the obtained gas pressure decrease amount of the hydrogen and also determining that there is a possibility that a chemical short is occurring when the determined consumption amount is greater than a reference value.

Examiner’s note: The control unit “100” is an equivalent structure for determining whether there is a possibility that a chemical short is occurring in the fuel cell when supply of the fuel gas and the oxidization gas to the fuel cell is stopped and for obtaining a gas pressure decrease amount of the fuel gas sealed on the anode side; the pressure sensor “51” is an equivalent structure for detecting a gas pressure of the fuel gas on the anode side of the fuel cell; the valves “24” & “25” are equivalent structures for closing off the anode side of the fuel cell when supply of fuel gas and the oxidization gas to the fuel cell is stopped; the compressor “41” is an equivalent structure for supplying air

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(scavenging gas) to the cathode side when it has been determined that there is a possibility that the chemical short is occurring and for scavenging residual gas on the cathode side by supplying a scavenging gas to the cathode side when a gas pressure decrease amount of the fuel gas sealed on the anode side by the anode side being closed off by the closing means is larger than a reference value. Further, it is well known in the art that a gas leak (hydrogen gas migration through the electrolyte membrane) can be detected (determined) by sealing the anode side of the fuel cell with the valves and then monitoring a decrease in the gas pressure of the anode side of the fuel cell.

Regarding claims 22 and 33, it is inherent that the pressure sensor “51” is at least capable of detecting a first gas pressure of the fuel gas sealed on the anode side after a first predetermined period of time has passed after the anode side of the fuel cell is closed off, and detecting a second gas pressure of the fuel gas sealed on the anode side after a second predetermined period of time has passed after the first gas pressure is detected, and to obtain a difference between the first gas pressure and the second gas pressure as the gas pressure decrease amount.

Regarding claims 25 and 34, it is inherent that the control unit “100” is capable of determining again when it has been determined that there is a possibility that the chemical short is occurring, whether there is a possibility that the chemical short is occurring, and the compressor (scavenging means) supplies air (scavenging gas) to the cathode side when it has been determined again that there is a possibility that the chemical short is occurring.

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Regarding claim 27, it is inherent that the compressor “41” (scavenging means) is capable of supplying to the cathode side an amount of the oxidation gas that is less than the amount of the oxidization gas supplied to the cathode side when the fuel cell is idling, when it has been estimated that there is a possibility that the chemical short is occurring.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being obvious over Yoshida et al (WO 2004/049488) in view of Boehm et al (US 6461751). The Yoshida reference is applied to claim 20 for reasons stated above.

However, Yoshida et al does not expressly teach a determining means that is provided with concentration means for detecting a gas concentration of the oxidization gas on the cathode side and the determining means determines that there is a possibility that the chemical short is occurring when it has been determined that the gas concentration of the oxidization gas remaining on the cathode side of the fuel cell has decreased to less than a second reference value when the supply of the fuel gas and the oxidization gas to the fuel cell is stopped. The Boehm reference discloses a sensor “104” that detects the concentration of the oxygen in the cathode; and a controller “105”



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that determines whether oxidant starvation (chemical short) or a likelihood of oxidant starvation has been detected and then increases the oxidant stoichiometry by using the motor "112" & mechanical device "111" to supply additional oxidant to the cathode (See column 9, lines 8-21, column 10, lines 17-21, column 12, lines 50-56, column 15, lines 7-11; and Figure 1). It also discloses that a controller "105" that detects oxidant starvation (chemical short) by monitoring for the concentration of oxygen at the cathode to see when the concentration falls below a threshold value (reference value) (See column 14, lines 36-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Yoshida fuel cell system to include a determining means that is provided with concentration means for detecting a gas concentration of the oxidization gas on the cathode side and the determining means determines that there is a possibility that the chemical short is occurring when it has been determined that the gas concentration of the oxidization gas remaining on the cathode side of the fuel cell has decreased to less than a second reference value when the supply of the fuel gas and the oxidization gas to the fuel cell is stopped in order to reduce parasitic power consumption and improve overall efficiency, while avoiding low oxidant stoichiometries that might cause reduced performance.

### ***Response to Arguments***

12. Applicant's arguments with respect to claims 20, 22, 23, 25-27, and 32-36 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Michener can be reached on (571) 272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/  
Primary Examiner, Art Unit 1795